NEAR EAST UNIVERSITY

Department of Materials Science and Nanotechnology

Engineering

Course Catalogue

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This course catalogue is developed to give information about the materials science and nanotechnology enginnering programme to all who are interested in the Near East University, Department of Materials Science and Nanotechnology Engineering.

The catalogue includes key information about the duration of the programme, mode of study, course description, credit and grading system etc. of the programme.

We hope you can find the necessary information to your questions about the Department of Materials Science and Nanotechnology Engineering and the course programme.

Sincerely

Assist. Prof. Dr. Süleyman AŞIR

Deputy Chairperson

Materials Science and Nanotechnology ENGINEERING Programme

General Information about the Department of Materials Science and Nanotechnology Engineering

Near East University, Department of Materials Science and Nanotechnology Engineering was founded in 2016.

Materials Science and Nanotechnology Engineering is a multi-disciplinary department to support and lead the nation's requirements and technological developments, to be able to conduct international projects and to have an authority in research areas. To perform research studies and to educate engineers equipped with technical "know-how", creative thinking and being able to try and research new technologies to achieve required goal. The vision of the department is to have respect and authority in engineering activities and to gain acceptance through research projects, support to the nation and delivering high quality engineers.

The aim of the Materials Science and Nanotechnology Engineeering department is to have graduates, who know production and characterization methods; to have scientific, technical, entrepreneurial and ethical sub-structures that can meet the rapidly changing and developing needs of our age. Students are educated to have scientific systematic approach in solving engineering problems, sound engineering base, life-long learning habits and research abilities

The department has one curriculum: English ,the language of instruction is English language.

Official length of programme: 4 years (excluding one year of English preparatory class for English programme), 2 semesters per year, 14 weeks per semester

Mode of study: full time

Profile of the Programme and Method of Education

Our specific objectives include:

(a)Educate skilled scientists with the essential analytical/quantitative skills and information to carry out research projects and find solutions to overcome the global, economic, environmental, and societal problems;

(b)Educate skilled scientists to design innovative systems, components, or processes with the help of energetic leadership, professional scientists and multidisciplinary communication;

(c)Train students and researchers to: work and communicate effectively in multidisciplinary teams, be able to recognize and solve engineering problems using methods, skills, and advanced tools required, understand the professional and ethical responsibility and recognize the need for, and an ability to engage in life-long learning.

In this respect, our programme consists of 42 courses in total, 78.6% of which are compulsory fundamental engineering courses, 14.3% are technical elective Materials Science and Nanotechnology Engineering courses and 7.1% free elective courses.

Qualification Awarded

Materials Science and Nanotechnology Engineer (MSE) (Bachelor's Degree)

Level of Qualification

Qualifications Framework- European Higher Education Area (QF-EHEA): 1

Access requirement(s)

High School Diploma. Admission of Turkish nationals is by Placement through anation-wide Student Selection Examination (ÖSS) administered by Assessment,Selection and Placement Centre (ÖSYM). Admissions of Turkish Cypriots is based on the Near East University Entrance and Placement exam. Admission of international students is based on their high school credentials. Proof of English Language proficiency is also required.

Qualification Requirements

139 Near East University Credits (Near East University Credit is contact hour based) which is total 240 ECTS credits must be completed after being successful in the courses to become a graduate of the materials science and nanotechnology engineering department.

ECTS is a credit system designed to make it easier for students to move between different countries. Since they are based on the learning achievements and workload of a course, a student can transfer their ECTS credits from one university to another so they are added up to contribute to an individual's degree programme or training. ECTS helps to make learning more student-centred. It is a central tool in the Bologna Process, which aims to make national systems more compatible.

ECTS also helps with the planning, delivery and evaluation of study programmes, and makes them more transparent (http://ec.europa.eu/education/ects/ects_en.htm) .

Converting US College Credit Hours (semester credit hours-SCH) to ECTS

ECTS is the most commonly used credit system in Europe. The major difference between the European Credit System ECTS and the US College Credit system is that the first is based on student workload and the second on contact hours. The ECTS is oriented towards the time required for a student to meet the intended study outcomes, while the U.S. system is more oriented towards the time a faculty member needs to teach.

Here is an example of conversion of credits from ECTS to Semester Credit Hours for a college or university in the U.S.: 1.67 ECTS = 1.00 US College Credit Hours

Conversion standards may vary between higher education institutions in the U.S.

(http://www.mastersportal.eu/articles/1110/what-you-need-to-know-about-academic-credit-systems-in-the-us.html)

A student is required to have minimum pass grade from each course and obtain minimum 2.00/4.00 cumulative Grade point Average (cumulative GPA) .

The students who have successfully completed the programme should be able to be science-based, skilled and competent materials science and nanotechnology engineers prepared to meet the challenges of practicing materials and nanotechnology engineering in the 21st century.

Arrangements for transfer from another materials science and nanotachnology enginnering department (Recognition of Prior Learning)

A student wishing a transfer from another university: the student must prove her/his English Proficiency if s/he wishes to attend the English Section. At the time of OSS examination the candidate's entrance score must not be less than the lowest score for admission to the Near East University, Materials Science and Nanotechnology Engineering Department. The transcript and course content of the applicant is examined by the department and the student is then accepted to the appropiate year of the programme.

For further details please contact:

Faculty of Engineering

Department of materials Science and Nanotechnology Engineering

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Examination Regulations, Assessment and Grading

In the four years of the materials science and nanotechnology engineering, students are evaluated by essay type questions, MCQ (multiple choice questions) exams, assignments and participation. The students must successfully complete two main exams: the mid-term and the final examinations for each course. If the student fails in any course, s/he is entitled to come up again for resit examination.

Grading Scheme and Grades

PERCENTAGE	COURSE GRADE	GRADE POINTS	
90-100	AA	4.00	(Excellent)
85-89	BA	3,50	(Excellent)
80-84	BB	3,00	(Very Good)
75-79	CB	2,50	(Very Good)
70-74	CC	2,00	(Good)
65-69	DC	1,50	(Good)
60-64	DD	1,00	(Good)
50-59	FD	0,50	(Failed)
0-49	FF	0,00	(Failed)

Occupational Profiles of Graduates

Graduates of the department can find employment in materials and nanotechnology industry and sub-industry on product development, production, quality control, purchasing, post-purchasing and marketing.

Programme Director

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Key Learning Outcomes

The student who successfully completes the program should be able to

- Apply mathematics, science, and engineering knowledge to understand materials and nanotachnology engineering related events
- Develop an essential understanding of the characteristics of the materials, the related processing and implementations along with a fundamental knowledge on their role in society, with emphasis on the science and engineering principles of nanoscale materials.
- Have the ability to work with multi-disciplinary engineering sciences.
- Identify and solve problems using technical literature for research tasks and system design.
- Understand professional, ethical responsibilities and standards of engineering practice.
- Use engineering techniques, skills, and tools for practice and product development.

Courses List with Near East University credits and ECTS

Please see the attached example of the diploma supplement which is given to all graduates of our university free of charge. It ıs arranged in English.

The diploma supplement is a document the purpose of which is to provide sufficient independent data to improve the international "transparency" and fair academic and professional recognition of qualifications (diplomas, degrees, certificates, etc.). It is designed to provide a description of the nature, level, context, content and the status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgments, equivalence statements or suggestions about recognition

COURSE OBJECTIVES AND CONTENTS:

YEAR 1

Orientation (course type: required; course code: MSN100)

Course objective: Lecture aims to give students a basic understanding about how they can adapt themselves for engineering education and campus life.

Course content: Course will be composed of tasks which will be carried out by students related with campus life eg: learning how to loan a book from library. Besides general knowledge on campus life the course will include field trips and seminars from professionals related with the field of material science and nanotechnology.

Turkish for Foreigners (course type: required; course code: YIT100)

Course objective: The aim of this course is to help students interact with non-English speaking people within their community.

Course content: Listening, written expression, oral expression, reading, conversation, grammar and translation.

English I (course type: required; course code: ENG 101)

Course objective: This course aims at enabling students to understand their lessons and to express themselves in English Language.

Course content: Within a thematic approach, reading, writing, speaking, and listening skills will be developed, with a language component in order to build onto the foundation established at the Department of English. In speaking and writing, students will be encouraged to use language forms that they learn through reading and listening. Under broad themes (or threads), the students will be exposed to extensive reading both in and outside the classroom. They'll be encouraged to read a variety of texts such as short stories, academic articles, research reports, reviews and journalistic texts as well as chapters from textbooks

General Chemistry (course type: required; course code: CHM 101)

Course objective: By the end of this course, students should understand the fundamental concept of atomic theory, chemical equations, thermochemistry and hands-on laboratory works.

Course content: A basic course with emphasizing the metric system. Introduction to atomic theory, stoichiometry. The structural and physical properties of matter. Periodic relationship among elements and periodic table. Gaseous state. Thermochemistry. Energy and enthalpy. Electronic structure of atoms. Electrochemistry. Chemical bonding.

Calculus I (course type: required; course code: MTH 101)

Course objective: At the end of this course students are expected to have a clear understanding of the ideas of Calculus as a solid foundation for subsequent courses in mathematics and other disciplines as well as for direct application to real life situations.

Course content: Functions, limits and continuity. Derivatives. Mean value theorem. Sketching graphs. Definite integrals, infinite integrals (antiderivatives). Logarithmic, exponential, trigonometric and inverse trigonometric functions and their derivatives. L'Hospital's rule. Techniques of integration. Applications of the definite integral, improper integrals

Technical Drawing I (course type: required; course code: ECC 103)

Course objective: The aim of this course is to provide students with the basics of AutoCAD, be able to transform data into graphical drawings and also draw orthographic projections and sections, learn basic engineering drawing formats.

Course content: Introduction to CAD. Principles of engineering drawing (1st and 3rd angle orthotropic projections), drawing methodology stages, line work and lettering, isometric and oblique projections, drawing layouts (working drawings and assembly drawings), machine

drawing features, sections and sectional views, geometrical constructions and dimensioning principles.

English II (course type: required; course code: ENG 102)

Course objective: This course aims to take students to intermediate advanced level of English.

Course content: This course will be a continuation of ENG 101, with greater emphasis on student autonomy, research skills and synthesizing ability. All the activities and tasks in ENG 101 will continue within a thematic approach. In Eng-102, the ability to evaluate, analyze and synthesize information in written discourse will be highlighted. Documentation in writing will be introduced at the beginning of the course, in order to solidly establish the skill by the end. Students will learn the discourse patterns and structures to be used in different essay types.Students will write two essays in ENG-102. 1. An academic essay with proper documentation. 2. A project report to be prepared throughout the course, including a literature review (displaying analysis/synthesis skills, and documentation), a definition/elaboration of a problem (using definition, description, cause/effect and comparison/contrast patterns) and suggestions for solution (including personal views and argumentation). Local and regional topics, personalizing the research and viewpoints will be recommended to prevent plagiarism. Instructors will have to keep in close contact with the students to guide them throughout the process

General Physics I (course type: required; course code: PHY 101)

Course objectives: The objective of this course is to provide students with a thorough understanding of the basic concepts of physics, rigorous description of physical phenomena and to improve students' problem-solving abilities.

Course content: Measurement, vectors, kinematics, force, mass. Newton's laws, applications of Newton's laws. Work and kinetic energy. Conservation of linear momentum. Impulse, collisions, rotation, moments of inertia. Torque, angular momentum, conservation of angular momentum, static equilibrium.

Calculus II (course type: required; course code: MTH 102)

Course objectives: This course aims at helping students further develop their problem solving and critical reasoning skills and to prepare them further study in mathematics, the physical sciences, or engineering.

Course content: Plane and polar co-ordinates, area in polar co-ordinates, arc length of curves. Limit, continuity and differentiability of function of several variables, extreme values, method of Lagrange multipliers. Double integral, triple integral with applications. Line integrals, Green's theorem. Sequences, infinite series, power series, Taylor's series. Complex numbers.

Mathematics for Engineering (course type: required; course code: MTH 214)

Course objectives: The objective of this course is to solve problems using mathematics in unfamiliar settings, and explain why mathematical thinking is valuable in daily life.

Course content: Using and learning the techniques required to make the data obtained from the experiments processable and usable.

Introduction to Materials Science and Nanotechnology Engineering course type: required; course code: MSN 101)

Course objectives: Make students gain basic knowledge on engineering, material science and nanotechnology engineering. Teach students how to use basic software for curve plotting, regression engineering calculations.

Course content: Introduction to Materials Science and Engineering. Classification of engineering materials and scaling. the interdisciplinary occur in materials science and engineering within the introduction of nanomaterials and nnanotechnology engineering. Engineering applications of nanomaterials, production methods, examples of the impact of social and ethical issues. The introduction of the nanomaterials properties analysis and research equipment.

General Physics II (course type: required; course code: PHY 102)

Course objectives: General Physics II is the second part of General Physics I. The aim of this course is to help students apply knowledge of physics everyday life activities and through problem solving exercises in the fileds of Electrical and Electromagnetics point of view.

Course content: Electrical charges. Coulomb's law. Electrical fields. Gauss's law. Electrical potential. Capacitance and dielectrics. Current and resistance. Direct current circuits. Magnetic fields. Sources of the magnetic field. Faraday's law of induction. Inductance and inductors.

Introduction to Computers and Programming (course type: required; course code: ECC 106)

Course objectives: The goal of this course is to help students know program language evolution and classification and basic computer architecture. Students will be able to solve basic numerical computation in binary, design and implement simple assembly language programs at the end of the course.

Course content: An introduction to fundamental concepts. Algorithms and flowcharts as tools of program design process. Basic program structure. Input/output statements. Control structures: Selection and repetition statements and arrays. Concept of modular programming: Procedures and Functions.

YEAR 2

Material Sciences (course type: required; course code: MSN 201)

Course objectives: The aim of this course is to evaluate the fundamentals of Materials Science and Engineering and to examine the application fields.

Course content: Classification of engineering materials, sub-groups. Microstructure of Engineering Materials Applications feature does not. CWR cycle. Mechanical and physical properties of the presentation. Atomic structure and bonds. Nanostructures. Crystal structure and set up. Crystal defects and material effect on the properties. Diffusion in solids. Phase diagrams and applications. Fe-C phase diagram. Steels and cast irons.

Mechanics of Materials (course type: required; course code: MSN 203)

Course objectives: Students who successfully complete this course should have knowledge of; Continuum mechanics for small deformations, Linear elasticity theory for isotropic and anisotropic materials, Linear viscoelasticity, Plasticity (yield criteria, flow laws and hardening rules), Viscoplasticity, Non-linear finite element methods for small deformations.

Course content: This course provides a broad perspective about carbon compounds, chemical bonds, molecular structure, intermolecular interactions, organic reactions and mechanisms, acids and bases, alkanes and cycloalkanes, conformational analysis, stereochemistry: chiral molecules, substitution and elimination reactions of alkyl halides, alkenes and alkynes (addition reactions), alcohols and ethers, aromatic compounds and reactions, aldehydes and ketones, carboxylic acids and amines.

Nanoscience and Physical Theory in Engineering (course type: required; course code: MSN 207)

Course objectives: Students who successfully complete will be able to:

Achieve a conceptual, theoretical and applied understanding of how atomic structure and composition define material properties at all scales, and in particular at the nano-scale

Acquire the necessary computational proficiency and knowledge about different first-principles based tools to study, characterize and optimize static and dynamic material properties, including but not limited to ab initio methods, density functional theory (DFT), adiabatic, non-adiabatic and coarse-grain force fields, molecular mechanics and molecular dynamics (MM/MD), Monte Carlo (MC) methods.

Learn about applications to materials design, energy storage and retrieval, tissue engineering, drug design, space exploration, and others addressed using the first-principles computational approach presented in the course.

Understand the broader impact of nano-scale science, engineering, and nanotechnology.

Course content: Physics of small systems. energy bands of electrons. Quantum phenomena and fluctuations in nanostructures . Schrödinger equation . The physical properties of nanostructured particles. Solid-state physics . Nanoelektronig entry.

Differential Equations (course type: required; course code: MTH 201)

Course objectives: To introduce the concept of first, second and higher order differential equations, and the methods of solving these equations

To emphasize the importance of Differential equations and its application in Engineering. To understand the concept of Laplace transform and its applications in solving differential equations and other engineering applications

Course content: The nature of differential equations, definition, ordinary and partial differential equations, order and degree, linear and nonlinear equations, Separable equations and Homogeneous equations, Exact equations, and integrating factors, Linear equations, and Bernoull's equation, and initial value problems.

Applications: simple electric circuits and free falling problems, parachute problem, radium decoposition and tank of water problem, Reduction of order and knowing one solution to find another solution and the general solution of second order linear differential equation, Introduction, the general solution of the homogeneous equation, and the general solution of nonhomogeneous differential equation, The homogeneous equation with constant coefficients and the solution of Euler's equidimensional equation.

The method of undetermined coefficients for finding the particular solution, The method of variation of parameters for finding the particular solution and initial value problems, Laplace transform of continuous functions, Laplace transform of discrete functions. Introduction to solution by series.

English Communication Skills (course type: required; course code: ENG 201)

Course objectives: The main aim of this course is to help students improve their spoken English and also improve their communication skills.

Course content: The main goal of ENG 201 is to enhance the students' competence and willingness to express themselves in an organized manner in academic and professional contexts, and to interact with others confidently. It is important that students learn to conduct independent research and think critically on issues raised in the course. ENG 201 will use an integrated, thematic approach with emphasis on advanced oral communication and academic presentation skills, with language components such as grammar, vocabulary and pronunciation. ENG 201 will be inter-active; students will be encouraged to listen actively, respond to presentations, and participate in discussions. Speaking activities and academic presentations will ensue from reading and listening activities. Each theme will lead to the production of an oral and/or written activity. Input on oral presentation skills will enable the students to distinguish between oral and written discourse, and emphasize the requirements of oral discourse (such as direct sentences, transitional words and signposts). Skills (such as good body language, effective eye contact and voice control) related to the delivery of an oral

presentation will be discussed and demonstrated.Active listening will be integrated into the course, with various tasks such as note-taking and peer evaluation

Material Sciences II (course type: required; course code: MSN 202)

Course objective: The aims of the course is to give fundamental knowledge about type of materials, their usage, properties and characteristics, which are important in engineering design. It is also aimed to give a theoretical background about the analysis of behavior of engineering materials by emphasizing important relationships between internal structure and properties. It attempts to present ways of modifying and control the material microstructures and especially mechanical properties (toughness, strength, fatigue and creep resistance) by suitable heat treatment operation.

Course content: The mechanical properties of engineering materials and mechanical tests . Strengthening operations. Proses↔ Microstructure ↔Performans relationship. electrical and magnetic properties of engineering materials. Other physical properties. Nanomaterials and engineering applications. Metallic and non-metallic materials in engineering applications. CWR used engineering materials and mechanisms. Non-destructive testing methods

Thermodynamics II (course type: required; course code: ECC 208)

Course objective: Providing fundamental background of thermodynamics principles and develop analytic ability in real-world engineering applications using thermodynamics principles.

Course content: Thermodynamic cycles. Thermodynamics of mixtures and solutions, chemical reactions. Thermodynamic and mechanics of compressible fluid flow. Thermodynamic of energy conversion systems, refrigeration and air conditioning.

Manufacturing Technology I (course type: required; course code: ECC 209)

Course objective: Students who take this course will gain a basic understanding of manufacturing systems management, including work organization, work measurement, basic scheduling mechanisms, and current theories of manufacturing management.

Course content: Basic manufacturing processes, nature and properties of materials, production of ferrous and nonferrous metals. Principles of metal casting, types of molding. Design of models and cores. Melting furnaces. Powder metallurgy. Welding, oxygen gas welding, torch cutting, electrical arc welding

Thermodynamics I (course type: required; course code: ECC 207)

Course objective: The objective of this course is to introduce the basic principles of thermodynamics via real-world engineering examples, to show students how thermodynamics is applied in engineering practice

Course content: Basic concepts and definitions of classical thermodynamics. Thermodynamic processes, work and heat interactions. First law for systems and for flow processes. Second law and entropy, irreversibility and availability.

Summer Practice I (course type: required; course code: MSN 200)

Course objective: The goal of this course is to familiarize students with the daily work of Materials Science and Nanotechnology Engineering

Course content: Summer training

YEAR 3

Fluid Mechanics (course type: required; course code: ECC 304)

Course objective: Course objective is to teach students how to develop energy equation on the moving or immobile fluids through engineering applications.

Course content: Introduction, Fundamental Concepts, Fluid Statics, Basic equations in integral Form for a Control Volume, Introduction to Differential Analysis of Fluid Motion, Incompressible Inviscid Flow, Dimensional Analysis and Similitude, Internal Incompressible Viscous Flow. Internal incompressible viscous flow.

Manufacturing Techniques II (course type: required; course code: ECC 305)

Course objective: Basic production processes, material properties and material properties, production of ferrous and non-ferrous metals. Fundamentals of metal casting, mold types. Mold and spade design. Melting furnaces. Powder metallurgy. Welding, oxygen gas supply, cutting, electric arc welding.

Course content: Molding and mold making, Permanent die casting, Die casting, Ovens, Foundry mistakes, Foundations of welding operations, Types of welding, Molding process, Molding technology, Overview of casting technology, Heating and casting, Solidification and cooling, Metal casting processes, Patterns and kernels

Heat Transfer I (course type: required; course code: ECC 306)

Course objective: A good understanding of heat transfer mechanisms and detailed inferences and questioning of the conduction mechanism

Course content: Basic introduction and concepts. One dimensional heat conduction in steady state. Heat conduction in unstable regime. Principles of convection heat transfer. Empirical and practical relationships in forced convection heat transfer. Natural convection heat transfer.

Introduction to Solid State Physics (course type: required; course code: MSN 302)

Course objective: The students are expected to understand why the classical description of the electron gas breaks down by comparing the classical results to the quantummechnical approach. This course also teaches to use approximations (e.g. the continuum approximation, explansion in small parameter) to allow to find analytical expressions, even if the starting expression is rather complex. Finally, three dimensional thinking is encouraged when discussing crystal structures.

Course content: Single-electron atoms , many-electron atoms, molecules, Crystal connections and configurations, Fermi- Dirac distribution, lattice vibrations, free electron model of metal, electronic and crystal organ vibrations interaction, semi-conductors.

Phase Transitions and Diagrams (course type: required; course code: MSN 305)

Course objective: This course is focused on the stability and equilibrium of phases. It deals with the thermodynamic description of phases and their transformations.

Course content: Balance, one-component system, nucleation in solidification; homogeneous and heterogeneous nucleation, growth of pure solid, liquid – solid interfaces, continuous growth, lateral growth, the solid-liquid interface in the temperature distribution, heat flow and interface stability, sub-cooling, alloy classification and solidification, single-phase alloys solidify, eutectic, peritectic solidification, solidification of ingots and casting, ingot structure, shrinkage, segregation, rapid cooling. Solid-solid transformation.Solid phase nucleation.The solid phase growth. For Phase Diagrams Thermodynamics Basics Single Component Phase Diagrams, Two Component Phase Diagrams

Nanomaterials and Manufacturing Methods (course type: required; course code: MSN 304)

Course objective: Students who successfully complete this course will be able to:

Introduce the various classes of nanomaterials: ranging from isolated nanostructures, through to nanostructures integrated in bulk materials

Applications ranging from existing commercial nanomaterials found in every day products through to the future generation of Nano-enabled products.

Course content: Nanoscale structure in metals, polymers and ceramics can have a marked influence on structure-property relationships with the possibility of providing behavior not seen in coarser scale structures. In addition, certain new classes of materials may also be produced at this size level, for example, carbon nanotubes, graphene and a variety of colloidal structures. The processing and applications of nanomaterials will also be examined

along with the requirements and techniques for characterizing a range of nanomaterials in isolation and as part of complex systems.

Material Selection and Design (course type: required; course code: MSN 312)

Course objective: Students who successfully complete this course will be able to:

Obtain basic knowledge of Materials Science and Engineering

Explore the relationships between structure, properties and applications and how this can be used in materials and process selection and design.

Introduce a systematic procedure for selecting materials that will most likely perform best in a given engineering application.

Enable students to become proficient in the derivation of material indices starting from the relevant equations describing the application, and to successfully carry out a simple mechanical design involving the determination of the relevant material properties, selection of suitable candidates and the building and testing of a working model.

Course content: Design concept, the steps of design, design tools, designed to damage , Case Studies , production methods and material selection in design, choice of materials and design in affordability ,availability, material and environment (recycling, ecological criteria , environmental damage of the material) ,Case Studies Production methods and defects arising from material selection , material selection , material property charts case study, hybrid materials case study design , materials selection , and ethical decision-making , team work .

Numerical Analysis (course type: required; course code: MAT 323)

Course objective: The aims are to learn about existence and uniqueness criteria for numerical methods, to learn about convergences criteria and to be aware of reasons why numerical methods may fail.

Course content: Approximations and errors. Accuracy and precision. Finite divided difference and numerical differentiation. Roots of equations, bracketing methods and open

methods, systems of nonlinear equations. Systems of linear algebraic equations. Curve fitting, interpolation. Numerical integration. Ordinary differential equations.

Mass Transfer (course type: required; course code: MSN 303)

Course objective: Students who successfully complete this course will be able to:

provide the necessary tools to help engineers design and operate processes and unit operations in chemical engineering and engineering chemistry

learn how to identify and quantify the fundamental heat and mass transfer mechanisms

to develop mass and energy balances, to simplify them, and to obtain solutions that are applicable to real problems.

Course content: Process metallurgy . Basics of mass transfer . Spreading principle and process stability . Drying , crystallization, distillation , extraction, drying, and membrane separation processes and mass transfer in this process.

Summer Practice II (course type: required; course code: MSN 300)

Course objective: The goal of this course is to familiarize students with the daily work of Materials Science and Nanotechnology Engineering

Course content: Summer training

YEAR 4

Nano-Scale Characterization (course type: required; course code: MSN 403)

Course objective: This course is designed to give students an introduction to common materials characterisation techniques, especially as a foundation for the laboratory work and case study later in the year. The course will cover the design and operation of the equipment, the information that can be gained from the different techniques, and the sample requirements and will be assessed by a test

Course content: Common nanoscale characterization instrument theory, operation and maintenance. An instrument provider in the marketplace promotion, development of tender

conditions, technical evaluation of tenders, plans for appropriate infrastructure works, the current oral and written evidence.

Experimental Methods (course type: required; course code: MSN 405)

Course objective: Students who successfully complete this course will be able to: Design and conduct experiments, as well as analyze and interpret data related to materials design and specification, Develop his/her knowledge in using different techniques and modern equipment for engineering applications, Develop an awareness of continuous learning in relation with modern technology, Find out new methods to improve his/her knowledge.

Course content: Mechanical and physical testing of engineering materials. Preparation and examination of microstructure samples. Macro-, micro- and nano-hardness tests. Atomic force microscope (AFM). Scanning electron microscope (SEM). Clean rooms. Nano-fabrication methods.

Graduation Project (course type: required; course code: MSN 400)

Course objective: The course is intended to evaluate students ability to complete a project without a given detailed structure usually found in undergraduate courses

Course content: Design or research projects are assigned including application and synthesis. The projects including prototype production are especially encouraged. Students may work alone or as a team. Supervisors and jury members grades the projects by considering the studies during the semester, project report and presentation.

Micro / Nano Measurement Instrumentation (course type: elective; course code: MSN 451)

Course content: Micro and nanosensor of, actuators, modules (micro-electromechanical systems, nanoelectromechanical systems and micro and nano fluid channel) for the development of construction techniques. Micro and nano example of the integration of instruments and chemical analysis. Current Micro and nano airports in perspective.

Semiconductor Technology (course type: elective; course code: MSN 452)

Course content: Basic semiconductor physics. PN – links, optoelectronic devices, bipolar transistors, field effect transistors and integrated circuits principles and modeling. Semiconductor integrated circuit device and an overview of the construction. Nano-technology and introduction of modern semiconductor technologies such as spin electronics.

BioNanoTechnology (course type: elective; course code: MSN 453)

Course content: Bio-application and introduction to bio-engineering. Biological nanostructures, bioelectronics, biophysics . Basic biochemistry, genetic engineering, and separation techniques. Bio-conjugation and characters on the surface of the biological system and nanoscale materials. Biosynthesis, inorganic nanocrystals.

Non-Metallic Materials Engineering (course type: elective; course code: MSN 456)

Course objective: Students who successfully complete this course will be able to: Design and conduct experiments, as well as analyze and interpret data related to materials design and specification; Develop his/her knowledge in using different techniques and modern equipment for engineering applications; Develop an awareness of continuous learning in relation with modern technology

Course content: Ceramics, polymers and composites Microstructure performance relations. Classification of ceramic materials, applications, manufacturing processes. Glass ceramics. Brittle materials and design. Classification of polymers and composite materials, applications, manufacturing processes. High-tech materials.

Physics of Nano-Electronics, Technology and Applications (course type: elective; course code: MSN 457)

Course content: Transport phenomena. Quantum limitation.Single molecule transistor.Resonant tunneling devices.A large area and flexible electronic and mechanical. Sediment layers and design techniques.

ME 453 Material Engineering (course type: elective; course code: ME 453)

Course objective: The aims are to give the student a sound background in the science of engineering materials diagram selections.

Course content: Engineering materials and their properties. Material selection and material development. Heat treatments and examples. Advanced materials. Brittle materials and designs. Weibull analysis. Material selection diagrams

Heat Treatment (course type: elective; course code: ME 454)

Course objective: The aims are to make students aware of the fact that desirable mechanical and other material properties in engineering materials can be achieved by a proper heat treatment design and practice.

Course content: The relation between material structure ↔ production technique ↔ material properties in engineering materials. Heat Treating of Steel - quenching, tempering and annealing, continuous annealing, quantitative methods to predict hardenability. Heat treating information for the most widely-used nonferrous alloys, cast iron, ceramics and glass.

Mechatronics (course type: elective; course code: EE 435)

Course objective: The aims are to give students necessary knowledge in using sensors, and actuators, electrical equipment and microprocessors for designing and building intelligent mechatronic systems

Course content: Introduction to Mechatronics and measurement systems. Sensors and transducers: Sensors and transducers, Performance terminology, Examples of sensors, Selection of sensors. Signal conditioning: Signal conditioning, The operational amplifiers for analog signal processing, Protection, Filtering, Digital circuits and systems. Measurement systems: Designing measurement systems, Data presentation systems,Measurement systems, Testing and calibration. Mechanical actuation systems: Mechanical systems, Kinematic chains, Cams, Gear trains, Ratchet mechanisms, Belt and chain drives. Electrical actuation systems: Electrical systems, Switches, Solenoids, Motors, Stepping motors. Basic system models: Mathematical models, Mechanical system building blocks, Electrical system building blocks, Fluid system building blocks, Thermal system building blocks. Simulation of simple mechanical systems by electrical elements (circuits). Design and mechatronics: Designing, Mechanisms, Examples of designs.

Image Processing (course type: elective; course code: EE 463)

Course content: Introduction to Image Processing, Digital Signal Processing. D- T and C- T signals and systems. Digital System features. Linearity and S -I. get the picture. Image Processing Techniques; Image Compression, Image Enhancement, Image Restoration and Image Identification.Corner Detection Techniques; Differential approach and identify the model.Mathematical Model of the image. Image Sampling and Quantumrenovation . Fold and Digital Image Correlation . Matlab is used in laboratory studies.

Management for Engineers (course type: elective; course code: MAN 402)

Course objective: The aims to develop a thorough understanding on management and budgeting principles.

Course content: Principles of management. Functions of managers. Organization and environment.Marketing management.Production management. Personnel management. Managerial control. Accounting and financial reports. Budgeting and overall control.

Economics for Engineers (course type: elective; course code: ECON 431)

Course objective: The aims to use the basic financial tools required for sound decision making in engineering and performing some cash flow calculations in engineering projects.

Course content: Principles and economic analysis of engineering decision making. Cost concept. Economic environment. Price and demand relations. Competition. Make-versus-purchase studies. Principles and applications of money-time relations. Depreciation. Many and banking. Price changes and inflation. Business and company finance.

SAMPLE COPY

NEAR EAST UNIVERSITY

DIPLOMA SUPPLEMENT

Diploma No:	**Diploma Date:**
1. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION	
1.1. ***Family name(s):*** **1.2.** ***Given name(s):***	**1.3.** ***Place and date of birth:*** **1.4.** ***Student identification number:***
2. INFORMATION IDENTIFYING THE QUALIFICATION	
2.1. ***Name of the qualification and (if applicable) the title conferred*** BACHELOR OF SCIENCE, B.Sc. **2.2.** ***Main field(s) of study for qualification*** MATERIALS SCIENCE AND NANOTECHNOLOGY ENGINEERING **2.3.** ***Name and status of awarding institution*** NEAR EAST UNIVERSITY, PRIVATE UNIVERSITY	**2.4.** ***Name and type of institution administering studies*** NEAR EAST UNIVERSITY, PRIVATE UNIVERSITY **2.5.** ***Language(s) of instruction/examinations*** ENGLISH
3. INFORMATION ON THE LEVEL OF THE QUALIFICATION	
3.1. ***Level of qualification*** First Cycle (Bachelor's Degree)	**3.2.** ***Official length of program*** Normally 4 Years (excluding 1 year English Preparatory School, if necessary), 2 semesters per year, 16 weeks per semester
3.3. ***Access requirement(s)*** Admission of Turkish nationalities to higher education is based on a nation-wide Student Selection Examination (ÖSS) administered by the Higher Education Council of Turkey (YÖK). Admission of Turkish Republic of Northern Cyprus nationals is based on the Near East University Entrance and Placement Exam for Turkish Cypriots. Admission of foreign students is based on their high school credentials. Proof of English language proficiency is also required.	
4. INFORMATION ON THE CONTENTS AND RESULTS GAINED	
4.1. ***Mode of study*** Full-Time	**4.2.** ***Programme requirements*** A student is required to have a minimum CGPA of 2.00/4.00 and no failing grades (below DD).
4.3. ***Objectives*** The aim of the automotive engineering department is to prepare engineering candidates for various branches of automotive industry with an improved self-confidence and individual initiative. Students are educated to have scientific systematic approach in solving engineering problems, sound engineering base, life-long learning habits and research abilities.	***4.4. Programme details and the individual grades/marks obtained*** Please see the next page.
4.5. ***Grading scheme, grade translation and grade distribution guidance:*** For each course taken, the student is assigned one of the following grades by the course teacher. For A.Sc., B.Sc. or B.A. degrees, students must obtain at least DD or S from each course and have a GGPA of not less than 2.00 out of 4.00 and have completed all the courses and summer practices in the program. For graduate degrees, students must obtain at least CC or S from each course for M.Sc. and M.A., at least BB for Ph.D. They also need to have a GCPA of 3.00 to graduate. The student's standing is calculated in the form of a Graduate Point Average (GPA) and Cumulative Grade Point (CGPA) and is announced at the end of each semester by the Registrar's Office. The total credit points for a course are obtained by multiplying the coefficient of the final grade by the credit hours. In order to obtain the GPA for any given semester, the total credit points are divided by the total credit hours. The averages are given up to two decimal points. Students who obtain a CGPA of 3.00-3.49 at the end of a semester are considered as "Honour Students" and those who obtain a CGPA of 3.50-4.00 at the end of a semester are considered as "High Honour Students" and this is recorded in their academic report. The letter grades, the quality point equivalents are:	

Percentage	Course Coefficient	Grade	Percentage	Course Coefficient	Grade
90-100	4	AA	70-74	2	CC
85-89	3.5	BA	65-69	1.5	DC
80-84	3	BB	60-64	1	DD
75-79	2.5	CB	50-59	0.5	FD
			49 and below	0	FF

I- Incomplete **S-** Satisfactory Completion, **U**-Unsatisfactory, **NA**-Never Attended, **E**-Exempted, **W**– Withdrawn

4.6 ***Overall classification of the award*** CGPA: 2.00 /4.00

5. INFORMATION ON THE FUNCTION OF THE QUALIFICATION

5.1. ***Access to further study***

May apply to second cycle programmes.

5.2. ***Professional status conferred***

This degree enables the graduates to teach English in public and private institutions.

6. ADDITIONAL INFORMATION

6. 1. ***Additional information***

The department is accredited by YOK and YODAK for its quality standards.

6.2. Sources for further information

Faculty web site
http://neu.edu.tr/tr/node/6204

Department web site
http://neu.edu.tr/tr/node/546

University web site
http://www.neu.edu.tr

The Council of Higher Education of Turkey

http://www.yok.gov.tr

Higher Education Planning, Evaluation Accreditation and Coordination of North Cyprus Council Web site
http://www.ncyodak.org

4.4. *Program details and the individual grade/marks obtained:*

1 (1th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
PHY 101	General Physics I	4	5	Compulsory	
CHM 101	General Chemistry	4	5	Compulsory	
MTH 101	Mathematics I	4	6	Compulsory	
ENG 101	English I	3	5	Compulsory	
ECC 103	Technical Drawing I	4	6	Compulsory	
MSN 100	Orientation	0	2	Compulsory	
YIT 100	Turkish for Foreign Students	0	1	Compulsory	
AIT 101	Ataturk's Principles&Reforms	0	1	Compulsory	
		19	30		

2 (2nd Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
PHY 102	General Physics II	4	6	Compulsory	
MTH 102	Calculus II	4	6	Compulsory	
ENG 102	English II	3	3	Compulsory	
ECC 016	Introduction to Computers and Programming	3	5	Compulsory	
MSN 101	Introduction to Materials Science and Nanothehnology Engineering	2	4	Compulsory	
MTH 214	Mathematics for Engineering	3	6	Compulsory	
		19	30		

3 (3rd Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
MSN 201	Materials Science I	3	5	Compulsory	
MSN 203	Mechanics of Materials	4	5	Compulsory	
MSN 207	Nanoscience and Physical Theory in Engineering	4	6	Compulsory	
MTH 201	Differential Equations	3	5	Compulsory	
ENG201	Communication Skills	3	3	Compulsory	
ECC 207	Thermodynamics I	3	6	Compulsory	
		21	30		

4 (4th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
MSN 202	Materials Science II	3	6	Compulsory	
ECC 209	Manufacturing Technology I	3	5	Compulsory	
MSN 208	Chemical Abstract Nano Science and Engineering	3	6	Compulsory	
PHY 201	Introduction to Quantum Physics	4	6	Compulsory	
ECC 208	Thermodynamics II	3	6	Compulsory	
MSN 200	Summer Practice I	0	1	Compulsory	
		16	30		

5 (5th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
ECC 304	Fluid Mechanics	4	6	Compulsory	
ECC 305	Manufacturing Techniques II	3	6	Compulsory	
ECC 306	Heat Transfer I	4	6	Compulsory	
MSN 302	Introduction to Solid State Physics	3	6	Compulsory	
MSN 305	Phase Transitions and Diagrams	3	6	Compulsory	
		17	30		

6 (6th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
MSN 304	Nanomaterials and Manufacturing Methods	3	6	Compulsory	
MSN 312	Material Selection and Design	4	6	Compulsory	
MTH 323	Numerical Analysis	4	6	Compulsory	
MSN 303	Mass Transfer	3	6	Compulsory	
TOSD - 1	Nontechnical Electives	3	6	R. Elective	
MSN 300	Summer Practice II	0	1	Compulsory	
		17	30		

7 (7th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
MSN 403	Nano-scale Characterization Methods	3	6	Compulsory	
MSN 405	Experimental Methods	3	6	Compulsory	
BSD -1	Elective Courses	3	4	T. Elective	
BSD - 2	Elective Courses	3	4	T. Elective	
BSD - 3	Elective Courses	3	4	T. Elective	
TOSD - 2	Nontechical Elective Course	3	6	R. Elective	
		18	30		

8 (8th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
MSN 400	Graduation Project	4	12	Compulsory	
BSD - 4	Elective Courses	3	4	Compulsory	
BSD - 5	Elective Courses	3	4	T. Elective	
BSD - 6	Elective Courses	3	4	T. Elective	
TOSD - 3	Nontechical Elective Course	3	6	R. Elective	
		16	30		

TOTAL LOCAL CREDITS: 143 - ECTS:240 CGPA:

7. CERTIFICATION OF THE SUPPLEMENT

7.1. *Date* :

7.2. Name and *Signature* :

7.3. *Capacity* :

7.4. *Official stamp or seal* :

8. INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM

The basic structure of the North Cyprus Education System consists of four main stages as pre-school education, primary education, secondary education and higher education.
Pre-school education consists of non-compulsory programs whereas primary education is a compulsory 8 year program for all children beginning from the age of 6. The secondary education system includes “General High Schools” and “Vocational and Technical High Schools”.

The Higher Education System in North Cyprus is regulated by the Higher Education Planning, Evaluation, Accreditation and Coordination Council (Yükseköğretim Planlama, Denetleme, Akreditasyon ve Koordinasyon Kurulu – YÖDAK). Established in 1988, the Council regulates the activities of higher education institutions with respect to research, governing, planning and organization. The higher education institutions are established within the framework of the Higher Education Law. All programs of higher education should be accredited by YÖDAK.

Higher education in North Cyprus comprises all post-secondary higher education programmes, consisting of short, first, second, and third cycle degrees in terms of terminology of the Bologna Process. The structure of North Cyprus higher education degrees is based on a two-tier system, except for dentistry, pharmacy, medicine and veterinary medicine programmes which have a one-tier system. The duration of these one-tier programmes is five years except for medicine which lasts six years. The qualifications in these one-tier programmes are equivalent to the first cycle (bachelor degree) plus secondary

cycle (master degree) degree. Undergraduate level of study consists of short cycle (associate degree) - (önlisans derecesi) and first cycle (bachelor degree) - (lisans derecesi) degrees which are awarded after the successful completion of full-time two-year and four-year study programmes, respectively.

Graduate level of study consists of second cycle (master degree) – (yüksek lisans derecesi) and third cycle (doctorate) – (doktora derecesi) degree programmes. Second cycle is divided into two sub-types named as master without thesis and master with thesis. Master programmes without thesis consists of courses and semester project. The master programmes with a thesis consist of courses, a seminar, and a thesis. Third cycle (doctorate) degree programmes consist of completion of courses, passing a qualifying examination and a doctoral thesis. Specializations in dentistry, accepted as equivalent to third cycle programmes are carried out within the faculties of dentistry. Specialization in medicine, accepted as equivalent to third cycle programmes are carried out within the faculties of medicine, and university hospitals and training hospitals operated by the Ministry of Health.

Universities consist of graduate schools (institutes) offering second cycle (master degree) and third cycle (doctorate) degree programmes, faculties offering first cycle (bachelor degree) programmes, four-year higher schools offering first cycle (bachelor degree) degree programmes with a vocational emphasis and two-year vocational schools offering short cycle (associate degree) degree programmes of strictly vocational nature.

Second cycle degree holders may apply to third cycle programmes if their performance at the first cycle degree level is exceptionally high and their national central Graduate Education Entrance Examination (ALES) score is also high and their application is approved. The doctoral degree is conferred subject to at least one publication in a cited and refereed journal.

GENERAL STRUCTURE OF THE NORTH CYPRUS EDUCATION SYSTEM